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Educational Value of YouTube Surgical Videos of Pediatric Robot-Assisted Laparoscopic Pyeloplasty: A Qualitative Assessment

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Abstract

Introduction: Surgeons and residents report using videos to prepare for procedures, with a preference for open access resources, specifically YouTube. The educational quality of online videos is uncertain. Videos are uploaded without quality assessment, and ranked by popularity. This study aims to better characterize the available pediatric robotic pyeloplasty videos on YouTube, and assess for conformity to LAParoscopic surgery Video Educational GuidelineS (LAP-VEGaS).

Methods: The most viewed videos of ''pediatric robotic pyeloplasty'' on YouTube were reviewed for baseline characteristics, educational content, inclusion of critical domains of the procedure (positioning, ports, exposure, ureteral mobilization, renal pelvis dissection, hitch stitch, spatulation, and anastomosis), and conformity to LAP-VEGaS.

Results: Once ranked by views, 23 videos met inclusion criteria. Views per video ranged from 40 to 15,664 (mean of 1912). The two oldest videos were uploaded in 2009, and had the highest number of views. Audio and written educational content accompanied videos, 22% and 48% of the time, respectively. United States and India were the most common countries of origin. Only six videos contained all critical steps of the procedure. No videos contained all 16 points of the LAP-VEGaS essential checklist (mean 7.6), and most videos neglected preoperative information and outcomes. Percentage conformity was 48% overall (range for each video was 25%–81%). The most viewed videos were not associated with higher conformity to LAP-VEGaS.

Conclusions: Despite studies demonstrating preferences for YouTube videos as an educational tool, and pyeloplasty being the most commonly performed pediatric robotic procedure, there are currently few high value educational videos available on YouTube. Videos often lack important procedure domains, and demonstrate low conformity to LAP-VEGaS guidelines. This demonstrates an opportunity to improve the educational quality and value of open access videos, starting by adopting established video reporting guidelines.

Keywords: pyeloplasty, surgical education, robotic surgery, pediatric urology

Introduction

Surgical education and training are evolving and adapting to a landscape of increasing minimally invasive procedures. Whereas open surgical education allows for the educator and trainee to work simultaneously, minimally invasive surgery requires more learning by watching. The old adage of ''see one, do one, teach one'' regrettably does not address the surgical preparation involved between these steps. Traditionally, surgical note-taking has been a primary resource for surgical trainees.[1] However, fantastic advances in high-definition video recording have allowed for surgical videos to be readily available, and these videos are becoming an increasingly used educational tool for both senior surgeons and residents/trainees to prepare for procedures. Studies in urology and general surgery literature have demonstrated that both surgical trainees and experienced surgeons have used videos as an educational tool, with a preference for open access sources.[2–5]

From 2008 to 2013, the number of pediatric robotic surgeries performed increased by 19.8% per year ($p < 0.001$).[6] A recent study by Varda and colleagues reviewed the national trends in utilization for open, laparoscopic, and robotic pediatric pyeloplasty from 2003 to 2015. The authors found open and laparoscopic pyeloplasty decreased annually by a rate of 10% and 12%, respectively, whereas robotic pyeloplasty grew

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by 29% annually, and that by 2015, robotic pyeloplasty accounted for 40% of robotic cases.[7]

Previous studies show that 98.6% of multispecialty respondents reported using videos to prepare for surgery, and among those who reported use of videos, the most used sources were YouTube, followed by society webpages, commercially available videos, and WebSurg.[4] This population included trainees and experienced surgeons, with resident trainees and surgeons with 1 to 3 years of experience reporting a higher use of videos.

The educational quality of videos available online is uncertain. They are uploaded without peer review or quality assessment, and are ranked based on popularity or number of views. Studies have demonstrated that trainees place a higher value on videos with supplementary educational content.[4] A consensus statement has been recently published regarding guidelines for reporting laparoscopic surgical videos for educational purposes known as the LAParoscopic surgery Video Educational GuidelineS (LAP-VEGaS).[8] These guidelines include recommendations for the materials to be present in educational videos, such as case presentation, demonstration of surgical procedure, outcomes and quality of video. The LAP-VEGaS criteria were developed to create a standardized approach to reporting of minimally invasive surgical videos for educational purposes.

The purpose of this study is to assess the existing free public-domain surgical videos for conformity to the LAP-VEGaS guidelines. Robot-assisted laparoscopic pyeloplasty was chosen as the procedure to review, as it is the most common robotic procedure performed in the pediatric population. We hypothesize that the educational quality of the video may not be related to the number of views. This study will help characterize the currently available online videos for pediatric urologic procedures for educational content, and help determine if there is a need for more high-quality video access.

Materials and Methods

This study reviewed public-domain videos exclusively and, therefore, Institutional Review Board exemption was obtained at the beginning of the study. YouTube (https://www.youtube.com) was queried on November 13, 2019 for the search terms ''pediatric robotic pyeloplasty'' and ''pediatric robotic-assisted pyeloplasty.'' The videos were sorted by view count and were selected based on the following criteria: live surgery recorded by laparoscopic camera (no cartoons or schematized video), professional videos for professionals (not promotional videos for patients or other commercial entities), portion of the procedure was performed robotically, patient age documented as 0 to 18 years or named ''pediatric'' in the video or video description.

Five videos were excluded from review out of a total of 28 videos that were retrieved from the YouTube search. Two videos were excluded because of age >18, two were promotional/nonsurgical videos, and one was a pure laparoscopic pyeloplasty. The remaining 23 videos meeting inclusion criteria were analyzed for baseline characteristics, educational content, inclusion of critical domains of the procedure, and conformity to the LAP-VEGaS checklist. Critical domains of the surgery included positioning, port placement, exposure, ureteral mobilization, dissection of renal pelvis, potential use of hitch stitch, ureteral spatulation, and anastomosis suturing. All videos were first reviewed for inclusion criteria, LAP-VEGaS criteria, and surgical domains by first author. The second author, reviewed the videos and findings for conformity. Critical domains of surgery have been adapted from prior publications of the surgical technique.[9–11] Descriptive statistics were presented as frequencies and percentages for categorical variables. Means, standard deviations, and ranges were obtained for continuous variables.

Results

Search results were analyzed, and 23 videos met inclusion criteria. Views per video ranged from 40 to 15,664 (mean of 1912, standard deviation 3443). The characteristics of the videos are available in Table 1. The two oldest videos were uploaded in 2009 and had the highest number of views, 15,664 and 7682 views, respectively. Video length ranged from ~2 to 56 minutes. Almost all videos (96%) used editing to highlight specific portions of the procedure or increase speed between critical steps. Only one video used a real-time unedited start to finish recording of the robotic portion of the procedure. The average time of the reviewed videos was 8 minutes and 26 seconds. Average number of likes and dislikes per video was 6.6 (range 0–47) and 0.47 (range 0–3), respectively. Nine of the 23 videos had YouTube user comments posted, and the maximum number of comments left on a single video was six comments (range 0–6, mean 0.95). United States and India were the most common countries of origin (48% and 39%, respectively). A country of origin could not be determined for three of the videos. Twenty-six percent of videos were associated with a U.S. academic institution. Most videos were uploaded individually, and were not associated with a series of videos. However, one surgeon was noted to have compiled a YouTube playlist, providing links to other videos highlighting anatomic variations of the pyeloplasty procedure. The surgeon's YouTube channel also had video recordings of other nonpyeloplasty pediatric urology cases.

Review of educational content revealed 30% of videos did not contain either audio or written content. Audio educational content was present in 22% of the videos. Written content was present in 70% videos, with 48% of videos having exclusively written content. All educational content that accompanied videos was in English, regardless of country of origin.

Critical domains of the procedure were evaluated as being present or not present in the video. They were not evaluated or assessed on surgical performance. Only six videos contained all critical steps of the procedure. Percentage of videos addressing each domain of the procedure were as follows: positioning 48%, port placement 52%, exposure 52% (transmesenteric or colonic mobilization), ureteral mobilization 74%, dissection of renal pelvis 87%, use of hitch stitch 74%, ureteral spatulation 91%, and ureteral anastomosis suturing 100%. Antegrade ureteral stenting was shown in 86% of videos, and retrograde stenting 8%. Only one video specifically addressed using the hidden incision endoscopic surgery trocar placement.

No videos contained all 16 points of the LAP-VEGaS essential checklist (mean 7.6 points, range 3–13 points), with almost all neglecting preoperative information and outcomes

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Table 1. Characteristics of Reviewed Surgical Videos on Robot-Assisted Laparoscopic Pediatric Pyeloplasty on YouTube

Video rank	*Video title*	*Number of views*	*Country*	*Upload date*	*Length (min)*	*No. of comments*	*No. of likes*	*No. of dislikes*
1	Pediatric Robotic Pyeloplasty—Children's Hospital Los Angeles	15,664	USA	7/18/09	7:26	0	16	0
2	Pediatric Robotic Pyeloplasty	7682	USA	3/5/09	9:47	1	4	1
3	Robotic Pyeloplasty	3407	Unknown	6/21/17	7:38	2	1	0
4	Pediatric Robotic Pyeloplasty 3 Port Technique	2788	USA	5/13/10	2:22	0	1	0
5	Left Robotic Infant Pyeloplasty	2738	India	2/15/19	10:25	6	20	2
6	How to Do Robotic Pyeloplasty in Child Demonstration by Dr Anshuman Agarwal	1886	India	10/10/16	3:38	4	47	0
7	First Robotic Pyeloplasty @ AIIMS Rishikesh	1656	India	6/28/18	2:51	0	10	3
8	Robotic Pyeloplasty in 2 Month Old Child | Ureteric Obstruction Removal Surgery in Child	1399	Unknown	4/29/18	3:38	4	8	0
9	Pediatric Robotic Pyeloplasty in Horseshoe Kidney	1246	USA	5/30/13	5:59	1	4	0
10	Pediatric Robotic Pyeloplasty in 4yr old Child.mpg	1083	India	6/10/12	9:31	1	0	1
11	Robotic Pyeloplasty at Kokilaben Hospital	1027	India	2/15/19	13:44	2	13	3
12	Infant Robotic Pyeloplasty, HIDES (No Scars)	853	USA	1/7/17	6:45	0	2	0
13	Robotic Pyeloplasty in Pediatric Age Group	580	India	2/20/18	10:17	0	8	0
14	Paediatric Robotic Assisted Lap Pyeloplasty 5 Years Child	434	India	2/28/12	2:39	0	0	0
15	Pediatric Robotic Pyeloplasty (Sujit Chowdhary)	406	India	2/24/16	3:17	0	3	0
16	Robotic Pediatric Ureterocalicostomy in a Horseshoe Kidney	353	USA	1/4/16	3:57	1	1	1
17	Pediatric Robot-Assisted Pyeloplasty	238	Unknown	4/20/17	5:33	0	1	0
18	Pediatric Retroperitoneoscopic Robotic Pyeloplasty for Crossing Vessel PUJO	238	India	3/9/19	13:40	0	7	0
19	Unedited Pediatric Robotic Pyeloplasty	95	USA	4/13/19	56:00	0	1	0
20	Robotic Pyeloplasty with Crossing Vessels, Pediatric	57	USA	1/8/19	3:07	0	0	0
21	Pediatric Robotic Pyeloplasty: Post Obstructive Ureteral Dilation	54	USA	1/31/19	3:15	0	2	0
22	Robotic Pyeloplasty: Pelvic Kidney	40	USA	2/22/19	2:23	0	0	0
23	Infant Robotic Pyeloplasty: 2 Month Old, Duplicated System	66	USA	5/23/19	6:14	0	3	0

HIDES = hidden incision endoscopic surgery; PUJO = pelviureteric junction obstruction.

(Table 2). Percentage conformity was 48% overall (range for each video of 25%–81%). The most viewed videos were not associated with higher conformity to LAP-VEGaS guidelines.

Discussion

Our study details the quality of surgical videos of pediatric robotic pyeloplasty as found on YouTube. These videos are available to trainees worldwide as a potential surgical education tool. To our knowledge, no urologic training program utilizes these videos as part of their educational portfolio. However, it is possible that trainees watch these videos in preparation for cases. With that in mind, we sought to analyze the educational value of the most commonly watched videos.

Prior studies in other disciplines have demonstrated marked heterogeneity in the quality of YouTube videos for surgical education.[12–14] Although some videos are created by leaders in their respective fields, there is no process for peer review and trainees should be critical of the videos they watch. To our knowledge, this is the first analysis of the quality of videos available on YouTube for pediatric robotic pyeloplasty.

A recent study from the United Kingdom showed that the overall preferred method for surgical preparation among trainees was watching videos. Most junior residents and senior residents chose videos as their preferred method for surgical preparation, with YouTube being the most common source cited.[2] Concerns regarding the quality of surgical videos available gave rise to a consensus statement on how to report

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Table 2. Conformity to LAParoscopic Surgery Video Educational GuidelineS Essential Checklist

Video number	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*Total*	*%*
Author information/introduction	2	2	2	2	2	2	2	0	2	2	2	0	2	0	2	2	0	2	1	1	1	0	1		
Title including pathology and procedure	1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	0	1	1	1	1	0	1	18	78
Authors' information and disclosures	1	1	1	1	1	1	1	0	1	1	1	0	1	0	1	1	0	1	0	0	0	0	0	14	61
Case presentation	1	3	2	3	3	1	1	1	3	4	3	2	2	4	4	4	1	1	1	1	1	1	4		
Patient anonymity	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23	100
Imaging	0	0	1	0	0	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	0	0	1	6	26
Baseline patient characteristics	0	1	0	1	1	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	1	12	52
Preoperative work-up and treatments	0	1	0	1	1	0	0	0	1	1	1	0	0	1	1	1	0	0	0	0	0	0	1	10	43
Demonstration of surgical procedure	2	4	4	2	3	2	2	2	3	3	3	3	2	2	2	2	2	3	3	2	2	3	3		
Theater setup and equipment needed	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	9
Patient, surgeon and trocar positions, and variations	0	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	0	1	1	0	0	1	1	12	52
Anatomic demonstration	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	22	96
Step-by-step approach	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	23	100
Outcome of procedure	0	0	0	1	1	0	0	0	3	2	1	0	0	0	0	4	0	0	0	0	0	0	0		
Time in theatre and in hospital	0	0	0	0	1	0	0	0	1	1	1	0	0	0	0	1	0	0	0	0	0	0	0	5	22
Morbidity	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	9
Pictures of wounds and specimens	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	3	13
Functional outcomes	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	2	9
Associated educational content	1	1	2	2	1	1	0	0	2	1	1	1	1	0	0	1	0	1	1	1	1	0	2		
Pictures, snapshots, diagrams, and tables	0	0	1	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	1	5	22
A/W	1	1	1	1	1	1	0	0	1	1	1	1	1	0	0	1	0	1	0	1	1	0	1	16	70
Audio/written commentary	AW	W	AW	W	W	W	None	None	AW	W	W	AW	W	None	None	AW	None	W	None	W	W	None	W	11	48
Point total	6	10	10	10	10	6	5	3	13	12	10	6	7	6	8	13	3	7	6	5	5	4	10	7.6	
Percentage	38	63	63	63	63	38	31	19	81	75	63	38	44	38	50	81	19	44	38	31	31	25	63	48	

A/W = audio/written; A = audio; W = written.

on minimally invasive videos for educational purposes—LAP-VEGaS.[8] The LAP-VEGaS guidelines are created by surgeons from multiple specialties, and are intended to help improve the educational value of videos used for training. We feel the ''ideal'' video for educational purposes would include the checklist for the LAP-VEGaS guidelines, as well as the critical portions of the surgical procedure.

There are some inherent limitations in this study. We restricted our analysis to single surgical procedure. We specifically chose the robotic pediatric pyeloplasty, as is it the most commonly performed robotic surgery in pediatric urology. Perhaps the educational quality of less commonly performed videos would be high yield for future studies. In addition, we only analyzed videos available on the YouTube platform. Videos available on other platforms were potentially missed because of the study design. We chose to focus on YouTube as our source, since it has been reported to be the most common source among surgical residents.[15]

The American Urological Association has a surgical video library that is available to members and eligible trainees. However, it is not a free, readily available platform. It includes one video, of a pure laparoscopic pyeloplasty, which does not cover many important aspects of the surgical procedure.[16] This distinct lack of available resources for trainees is also a ripe opportunity for improvement and implementation of vetted surgical videos specifically for training purposes.

Conclusions

Pyeloplasty is the most common robotic procedure performed in pediatric surgery. Despite a preference for using videos as an educational tool, there are few high-quality open access videos available. Available videos often lack important domains of the procedure, do not cite sources, and demonstrate low conformity to LAP-VEGaS guidelines. There is an opportunity to improve the educational quality and value of open access videos, starting by adopting video reporting guidelines.

Author Disclosure Statement

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Abbreviation Used

A/W = audio/written
HIDES = hidden incision endoscopic surgery
LAP-VEGaS = LAParoscopic surgery Video Educational GuidelineS
PUJO = pelviureteric junction obstruction

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